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The plates are not properly distributed to give an idea of the period in the case of either star.

W. W. CAMPBELL,  
J. H. MOORE.

#### COMET NOTES.

In comet affairs a very unusual state exists, no less than four being under observation at date. Three of these have been discovered this year, giving so far an average of one comet per month. Comet *a* 1906 was discovered by BROOKS at Geneva, New York, on the 26th of January. Two orbits of this comet were computed by Mr. CHAMPREUX and myself. According to the second set of elements, the comet is moving in a retrograde orbit whose plane is inclined  $126^\circ$  to the ecliptic. Its nearest approach to the Sun was December 22d of last year, when it was one hundred and twenty-one million miles from it. The elements and an ephemeris may be found in *L. O. Bulletin* No. 91.

The second comet of this year was discovered very nearly at opposition by KOPFF at Heidelberg, March 3d.

So far only a preliminary orbit of this comet has been derived. It is given in *L. O. Bulletin* No. 92. As soon as the weather permits another observation to be made at the Lick Observatory a second orbit will be computed. According to the preliminary elements, this comet is distinguished by having an inclination to the ecliptic of only  $1^\circ 8'$ , which is smaller than that for any other known comet. The nearest approach to the Sun, one hundred and twenty-two million miles, was on the 25th of December last year.

It may be of interest to computers to note that in the case of this comet, a very unfavorable one for the old methods, using LEUSCHNER's short method, the elements were obtained by using six-place logarithms, in three and one half hours actual computing time after the receipt of the third observation.

The third comet of this year was discovered March 17th by ROSS at Melbourne, Australia. Unfortunately, ever since its discovery cloudy weather has prevailed on this coast, so that up to date it has not been observed at the Lick Observatory.

Dr. MORGAN, of Morrison Observatory, Glasgow, Missouri, kindly sent observations of the 19th and 21st through the Harvard College Observatory. But before his third observation was available here preliminary elements were received from the Naval Observatory based upon observations of the 19th, 20th, and 21st. No observations, however, besides those of MORGAN were given out to the astronomical public. An orbit will be computed here from a longer arc.

RUSSELL TRACY CRAWFORD.

BERKELEY ASTRONOMICAL DEPARTMENT, March 24, 1906.

ELEMENTS OF COMET *b* 1906 (KOPFF).

A third observation of this comet to serve for the determination of the orbit from longer intervals than those used in the first preliminary orbit (*L. O. Bulletin* No. 93) was secured by Mr. J. D. MADDRILL at the Lick Observatory on March 27th during a clear spell in the recent stormy weather. This observation, as well as the others on which a second orbit was based, was kindly communicated to the Students' Observatory by the Lick Observatory. The three positions, all of which are by MADDRILL, are as follows:—

1906	Gr. M. T.	App. $\alpha$	App. $\delta$
March	5.7743	11 <sup>h</sup> 35 <sup>m</sup> 00 <sup>s</sup> .8	+ 1° 42' 40"
	15.76865	11 30 41.3	1 57 33
	27.7448	11 25 50.7	+ 2 14 40

From these we have derived the following elements:—

$$\begin{array}{l}
 T = 1905 \text{ October } 20.8024 \text{ Gr. M. T.} \\
 \omega = 159^{\circ} 03' 06'' \\
 \Omega = 342 \quad 09 \quad 54 \\
 i = 4 \quad 12 \quad 37 \\
 q = 3.31645
 \end{array}
 \left. \vphantom{\begin{array}{l} \omega \\ \Omega \\ i \end{array}} \right\} 1906.0$$

These elements leave a residual of  $-2''$  (O.—C) in the first and third right ascensions. It will require a still longer arc to determine the elements to any degree of certainty. The small value of the residuals for the parabolic orbit does not as yet warrant the determination of elements without hypothesis regarding the eccentricity.

The perihelion distance of the first preliminary orbit was  $q=1.3$ . The new solution was made on the basis of the first preliminary orbit by the differential formulæ of LEUSCHNER's short method, which were found to be fully, although